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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Electrical alternators.

We, K. G. CORFIELD LIMITED, a British Company, of 22-24 Ely Place, London, E.C.1, do hereby declare the invention which was communicated from PRESTALITE INTERNATIONAL COMPANY, an American Company, of P.O. Box 931, Toledo, Ohio 43601, United States of America, for which we pray that a Patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to electrical alternators of the kind having a rotor carrying field windings and having poles shaped so as to present inner faces which face the interior of the rotor, and a stator carrying armature windings. The invention is particularly, but not exclusively, applicable to alternators for use in motor vehicles.

The rotor of such an alternator may have a plurality of poles around its circumference such that each pole, in use, is of opposite polarity to that of its two immediate neighbours. In some constructions alternate poles, which are of the same polarity when the alternator is in use, are connected together at one end of the rotor.

According to the present invention there is provided an alternator of the kind specified in which the poles are supported on a non-magnetic material cast or moulded against the inner faces of the poles.

The term non-magnetic is used to describe materials which are not ferro-magnetic, and the term magnetic is used to describe materials which are ferro-magnetic.

With the aid of the invention it is possible to use poles thinner than would otherwise be used, as the distortion of the poles due to the centrifugal forces can be partly prevented by the material which is cast or moulded against them and which supports them. Hitherto it has been usual to provide poles sufficiently thick to withstand the centrifugal forces. Such poles were generally thicker than necessary from a magnetic point of view, it being possible to carry the magnetic flux in thinner poles. With the present invention there is now no need to provide poles of a thickness greater than is necessary to carry the magnetic flux.

It is also possible to make rotors lighter in weight than those made heretofore, and to reduce the moment of inertia. This should reduce the wear on the rotor bearings, and when the alternator is belt-driven, as in a motor vehicle, should reduce the wear on the driving belt.

In preferred constructions the cast or moulded material extends between the poles and fills the gaps between them so that the outer surface of the rotor in the neighbourhood of the poles is unbroken. The fact that the outer surface of the rotor is unbroken helps to reduce the noise produced by the alternator in use. Some or all of the edges of the poles may be angled, chamfered or otherwise shaped to provide a key into the non-magnetic bonding material.

The invention may with advantage be applied to alternators of the kind used in motor vehicles and having imbricated poles, the rotor comprising a pair of spaced discs each having poles at its periphery pointing towards the other disc, each pole on each disc extending between two adjacent poles from the other disc. Hitherto, the poles have normally been made integrally with the discs. It is now proposed to form the poles separately from the discs. Preferably each of the two sets of poles (one set of one polarity and the other set of the other polarity) is unitarily or otherwise joined at one end to a tubular band of magnetic material which is in contact with a separately formed disc of magnetic material, the field windings being disposed in the rotor between the discs. Each of the sets of poles together with the associated band may be formed unitarily from tubular stock. Alternatively they may be

formed unitarily from sheet material rolled into tubular shape.

The poles are preferably made from a low carbon steel or iron, and the non-magnetic material on which they are supported is preferably aluminium or a phenolic-base plastics material.

The invention will now be more particularly described with reference to the accompanying drawings, in which:—

Figure 1 is a side view of the rotor of an alternator in accordance with the invention, and

Figure 2 is an axial section through the rotor shown in Figure 1.

The rotor illustrated is intended for use with a stator (not shown) of the well-known kind comprising a casing with bearings at each end for the rotor, armature windings connected to output terminals, and a pair of brushes with terminals for connection to the source of current for exciting the field windings. The rotor comprises a shaft 10 with slip rings 11 for making contact with the brushes on the stator. The slip rings are connected to a field coil 12 co-axial with the shaft 10 and located between a pair of spaced discs 13 of magnetic material mounted on the shaft. Each of the discs 13 has an integral spigot 14 adjacent to the shaft 10, the spigots abutting each other and extending through the field coil 12. Each of the discs 13 fits inside a tubular band of magnetic material, one band having the reference numeral 15 and the other having the reference numeral 16. Each of the bands 15 and 16 is integrally joined to a plurality of poles 17. Each of the poles 17 is of tapered shape, as illustrated, being broader at that end joined to the associated band than at the other end. The poles 17 are imbricated, that is the poles joined to each band point towards the other band, and each pole on each band extends between two adjacent poles joined to the other band. Each of the bands 15 and 16 and its poles 17 is preferably formed from tubular stock though it may be formed from sheet material rolled into tubular shape and secured together at the ends.

The poles 17 are supported on a body 18 of generally annular form which is cast or moulded onto the poles and adheres to them. The body 18 may be made of aluminium or of a phenolic-base plastics material. The body extends between the poles 17 and fills the gaps between them so that the outer surface of the rotor in the neighbourhood of the poles is of unbroken cylindrical form.

In an alternative construction, not illustrated, the edges of the poles 17 are chamfered so as to key into the body 18. In such a case it is not essential for the body to adhere to the poles, though this is desirable.

WHAT WE CLAIM IS:—

1. An alternator of the kind specified in which the poles are supported on a non-magnetic material cast or moulded against the inner faces of the poles.

2. An alternator according to Claim 1 in which said non-magnetic material extends between the poles and fills the gaps between them so that the outer surface of the rotor, in the neighbourhood of the poles, is unbroken.

3. An alternator according to either of Claims 1 and 2 in which some or all of the edges of the poles are angled, chamfered or otherwise shaped to provide a key into the non-magnetic material.

4. An alternator according to any of Claims 1 to 3 with imbricated poles, each of the two sets of poles (one set of one polarity and the other set of the other polarity) being unitarily or otherwise joined at one end to a tubular band of magnetic material which is in contact with a separately formed disc of magnetic material, the field windings being disposed in the rotor between the discs.

5. An alternator according to Claim 4 in which each of the sets of poles together with the associated band are formed unitarily from tubular stock.

6. An alternator according to Claim 4 in which each of the sets of poles together with the associated band are formed unitarily from sheet material rolled into tubular shape.

7. An alternator according to any of Claims 1 to 6 in which the non-magnetic material comprises aluminium.

8. An alternator according to any of Claims 1 to 6 in which the non-magnetic material comprises a phenolic-base plastics material.

9. An alternator of the kind specified with a rotor substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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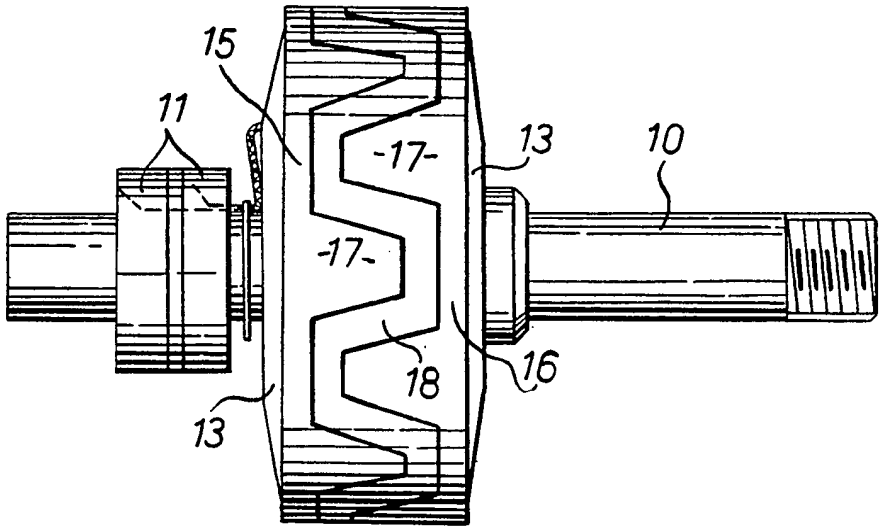
1 SHEET

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale.

FIG 1



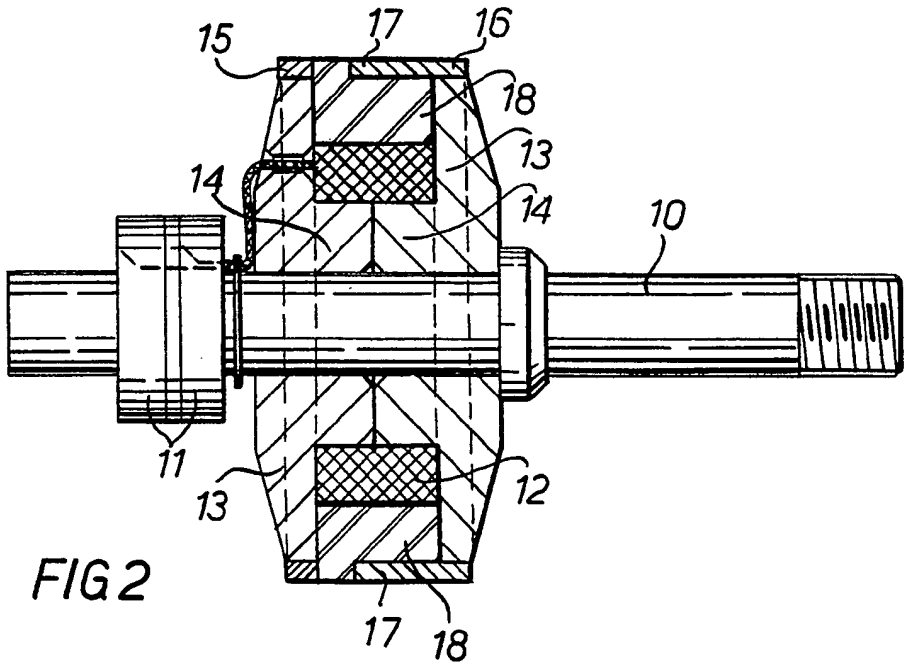


FIG 2